

Claims

What is claimed is:

1. An ultra-thin optical fingerprint sensor with anamorphic optics comprising:
an image receiving panel;
5 an anamorphic optical lens of at least two optical magnification power; and
an imaging sensor; wherein the image sensor captures a light reflection from an
image deposited on the image receiving panel optically compensated by the anamorphic
optical lens.

10 2. The anamorphic optics of claim 1 wherein the lens comprises a horizontal
cylindrical lens and a vertical cylindrical lens.

3. The ultra-thin optical fingerprint sensor of claim 1 wherein a light source is
provided perpendicular to the plane of the image captured.

15 4. The ultra-thin optical fingerprint sensor of claim 3 wherein the light source
comprises a light emitting diode (LED).

5. An ultra-thin optical scanner with anamorphic optics comprising:

20 an image receiving panel;

an anamorphic optical lens of at least two optical magnification power; and

an imaging sensor; wherein the image sensor captures a light reflection from an image deposited on the image capturing panel optically compensated by the anamorphic optical lens.

5 6. The anamorphic optics of claim 5 wherein the lens comprises a horizontal cylindrical lens and a vertical cylindrical lens.

7. The ultra-thin optical scanner of claim 5 wherein a light source is perpendicular to the plane of the image captured.

10 8. The ultra-thin optical scanner of claim 7 wherein the light source comprises a light emitting diode (LED).

15 9. An ultra-thin optical image sensor with anamorphic optics comprising:
an image receiving panel;
an anamorphic optical lens of at least two optical magnification power; and
an imaging sensor; wherein the image sensor captures a light reflection from an image deposited on the image capturing panel optically compensated by the anamorphic optical lens.

20 10. The anamorphic optics of claim 9 wherein the lens comprises a horizontal cylindrical lens and a vertical cylindrical lens.

11. The ultra-thin optical fingerprint sensor of claim 9 wherein a light source is provided perpendicular to the plane of the image captured.

5 12. The ultra-thin optical fingerprint sensor of claim 11 wherein the light source comprises a light emitting diode (LED).

13. An ultra-thin optical fingerprint sensor with anamorphic optics comprising:
an image receiving panel;
10 an anamorphic optical lens of at least two optical magnification powers;
an imaging sensor; wherein the image sensor captures a light reflection from an image deposited on the image capturing panel optically compensated by the anamorphic optical lens;
a folding mirror to fold a light reflection from an image deposited on the image
15 capturing panel through the image capturing panel to the anamorphic lens; and
a bending mirror to bend a light reflection from the anamorphic lens to the imaging sensor.

14. The anamorphic optics of claim 13 wherein the lens comprises a horizontal
20 cylindrical lens and a vertical cylindrical lens.

15. The ultra-thin optical fingerprint sensor of claim 13 wherein a light source is provided perpendicular to the plane of the image captured.

16. The ultra-thin optical fingerprint sensor of claim 15 wherein the light source
5 comprises a light emitting diode (LED).

17. An ultra-thin optical scanner with anamorphic optics comprising:

an image receiving panel;

an anamorphic optical lens of at least two optical magnification powers;

10 an imaging sensor; wherein the image sensor captures a light reflection from an image deposited on the image receiving panel optically compensated by the anamorphic optical lens;

a folding mirror to fold a light reflection from an image deposited on the image capturing panel through the image receiving panel to the anamorphic lens; and

15 a bending mirror to bend a light reflection from the anamorphic lens to the imaging sensor.

18. The anamorphic optics of claim 17 wherein the lens comprises a horizontal cylindrical lens and a vertical cylindrical lens.

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19. The ultra-thin optical scanner of claim 17 wherein a light source is provided perpendicular to the plane of the image captured.

20. The ultra-thin optical scanner of claim 19 wherein the light source comprises a light emitting diode (LED).

5 21. An ultra-thin optical image sensor with anamorphic optics comprising:
an image receiving panel;
an anamorphic optical lens of at least two optical magnification powers;
an imaging sensor; wherein the image sensor captures a light reflection from an
image deposited on the image receiving panel optically compensated by the anamorphic
10 optical lens;

a folding mirror to fold a light reflection from an image deposited on the image
receiving panel to the anamorphic lens; and

a bending mirror to bend a light reflection from the anamorphic lens to the
imaging sensor.

15 22. The anamorphic optics of claim 21 wherein the lens comprises a horizontal
cylindrical lens and a vertical cylindrical lens.

23. The ultra-thin optical image sensor of claim 21 wherein a light source is
20 provided perpendicular to the plane of the image captured.

24. The ultra-thin optical image sensor of claim 23 wherein the light source comprises a light emitting diode (LED).

25. A method for ultra-thin optical fingerprint sensor comprising of:

5 receiving an image on an image receiving panel;
processing the received image through an anamorphic lens; and
capturing and storing the processed image from the anamorphic lens.

26. A method for ultra-thin optical scanner comprising of:

10 receiving an image on an image receiving panel;
processing the received image through an anamorphic lens; and
capturing and storing the processed image from the anamorphic lens.

27. A method for ultra-thin optical image sensor comprising of:

15 receiving an image on an image receiving panel;
processing the received image through an anamorphic lens; and
capturing and storing the processed image from the anamorphic lens.

28. The method of Claim 25 wherein the step of processing the received image

20 comprises:

folding the received image via a folding mirror to direct the folded image to the anamorphic lens;

compensating the folded image with the anamorphic lens; and
bending the compensated image via a bending mirror to direct the compensated
image towards an image sensor to capture the compensated image.

5 29. The method of Claim 26 wherein the step of processing the received image
comprises:

folding the received image via a folding mirror to direct the folded image to the
anamorphic lens;

compensating the folded image with the anamorphic lens; and

10 bending the compensated image via a bending mirror to direct the compensated
image towards an image sensor to capture the compensated image.

30. The method of Claim 27 wherein the step of processing the received image
comprises:

15 folding the received image via a folding mirror to direct the folded image to the
anamorphic lens;

compensating the folded image with the anamorphic lens; and

bending the compensated image via a bending mirror to direct the compensated
image towards an image sensor to capture the compensated image.

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